

Appendix 1: Supplementary tables [posted as supplied by author]

Table A. Introduction of vaccination against specified diseases into the NIP in children aged ≤ 2 years

| Year | Disease |
|------|---------------------------------------|
| 1957 | Diphtheria, pertussis, tetanus, polio |
| 1974 | Rubella |
| 1976 | Measles |
| 1987 | Mumps |
| 1993 | <i>Haemophilus influenza</i> type b |
| 2002 | Meningococcal disease serogroup C |
| 2006 | Pneumococcal disease |
| 2011 | Hepatitis B |

Abbreviation: NIP, National Immunisation Programme.

Table B. List of ICD-9 codes per type of infection

| Type of infection | ICD-9 codes |
|-------------------|--|
| Upper respiratory | 034.0, 381.0 – 381.6, 382.0 – 383.2, 383.8 – 383.9, 460 – 465, 473, 474.0, 475, 476.0 |
| Lower respiratory | 073.0, 466, 485 – 486, 480, 482 – 483, 484.1, 484.5 – 484.8, 487 – 488, 510, 511.0, 513 |
| Gastrointestinal | 001 – 009, 021.1 – 021.2, 088.0, 127, 129, 136.5, 535.0, 535.4 – 535.6 |
| Other infections | 010 – 018, 020 – 027, 030 – 031, 034.1, 035, 036.0, 036.4 – 036.9, 038.0 – 038.1, 038.3 – 038.9, 039 – 040, 041.0 – 041.1, 041.3 – 041.4, 041.6, 041.8 – 041.9, 045 – 048, 049.0 – 049.1, 049.8, 052.0, 053.0, 054.0, 054.2 – 054.9, 055.0, 056.0, 061 – 066, 070.0 – 070.1, 070.4 – 070.7, 071, 072.1 – 072.2, 076, 077.98, 078.1, 078.81, 078.3, 079.89, 079.98, 080 – 083 – 086, 087, 088.8 – 088.9, 099.2, 100 – 104, 110 – 134, 133.8 – 133.9, 136.2 – 136.9, 320 – 322, 323.0 – 323.6, 323.8 – 323.9, 372.0, 372.2 – 372.3, 373.0 – 373.2, 373.4 – 373.9, 380.0 – 380.2, 390 – 391, 420 – 421, 424.9, 595.0, 597, 590.1 – 590.3, 590.9, 680 – 683, 686.0, 686.8 – 686.9, 690.8, 695.81, 684, 711.0, 711.4 – 711.8, 728.0, 730.0 – 730.2, 730.8 – 730.9, 995.91 |

Table C. List of ICD-9 codes for chronic diseases

| Type of disease | ICD-9 codes |
|-----------------------------------|--|
| Cancer | 140 - 209 |
| Congenital | 740 - 759 |
| Nervous system | 331.3 – 331.5, 335, 343, 345, 356, 359.0 – 359.2 |
| Endocrine, metabolic and immunity | 250, 270 – 272, 275, 277.0 – 277.2, 277.4 – 277.5, 279 |
| Circulatory system | 416, 420 – 429 |
| Genitourinary system | 581 – 583, 585 – 589, 591, 593.3 – 593.7 |
| Respiratory system | 515 – 516, 770.7, 771.0 – 771.1 |
| Digestive system | 570 – 573, 530.11, 530.81 |
| Autoimmune | 131.1, 446, 710, 725 |

Table D. HR (95% CI) for hospital admissions (>1 day) due to infectious disease according to the most recent vaccination (DTaP-IPV-Hib-4+PCV vs. MMR+MenC), stratified by sex and by birth year

| | Most recent vaccine | Fully-adjusted HR (95% CI) |
|--|---------------------|----------------------------|
| <i>Stratified by sex (p for interaction=0.55)</i> | | |
| Boys | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.61 (0.54 – 0.68) |
| Girls | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.66 (0.58 – 0.75) |
| <i>Stratified by birth year (p for interaction=0.29)</i> | | |
| 2005 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.67 (0.53 – 0.84) |
| 2006 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.59 (0.47 – 0.72) |
| 2007 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.56 (0.450 – 0.71) |
| 2008 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.60 (0.49 – 0.73) |
| 2009 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.64 (0.52 – 0.79) |
| 2010 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.76 (0.61 – 0.94) |
| 2011 | DTaP-IPV-Hib-4+PCV | 1.00 |
| | MMR+MenC | 0.56 (0.42 – 0.76) |

Hazard ratios from Cox regression with age as underlying time scale and stratified for date of birth.

Adjusted for sex (in by birth year stratified analysis only), chronic disease, hospitalization for any reason between age 8 and 9 months, birth weight, gestational age, maternal age and parity, parental country of birth, and postal code.

Table E. HR (95% CI) for hospital admissions (>1 day) due to infectious disease according to the most recent vaccination, stratified per type of infection

| Type of infection | Most recent vaccination | Events / person-years | Hazard ratio (95% CI) ¹ | |
|-------------------|-------------------------|-----------------------|------------------------------------|-----------------------------|
| | | | Age adjusted | Fully-adjusted ² |
| Upper respiratory | DTaP-IPV-Hib-4+PCV | 1,664 / 285,664 | 1.00 | 1.00 |
| | MMR+MenC | 2,765 / 782,900 | 0.50 (0.44 to 0.57) | 0.54 (0.48 to 0.62) |
| Lower respiratory | DTaP-IPV-Hib-4+PCV | 1,234 / 285,731 | 1.00 | 1.00 |
| | MMR+MenC | 2,120 / 783,457 | 0.52 (0.44 to 0.57) | 0.56 (0.49 to 0.66) |
| Gastrointestinal | DTaP-IPV-Hib-4+PCV | 1,816 / 285,657 | 1.00 | 1.00 |
| | MMR+MenC | 2,942 / 782,668 | 0.67 (0.59 to 0.76) | 0.70 (0.61 to 0.80) |
| Other | DTaP-IPV-Hib-4+PCV | 619 / 285,841 | 1.00 | 1.00 |
| | MMR+MenC | 1,199 / 784,270 | 0.61 (0.50 to 0.75) | 0.63 (0.52 to 0.77) |
| Upper respiratory | DTaP-IPV-Hib-3+PCV | 3,965 / 641,526 | 1.00 | 1.00 |
| | DTaP-IPV-Hib-4+PCV | 1,259 / 232,558 | 0.65 (0.56 to 0.74) | 0.72 (0.62 to 0.82) |
| Lower respiratory | DTaP-IPV-Hib-3+PCV | 3,149 / 641,709 | 1.00 | 1.00 |
| | DTaP-IPV-Hib-4+PCV | 934 / 232,751 | 0.69 (0.59 to 0.81) | 0.79 (0.67 to 0.92) |
| Gastrointestinal | DTaP-IPV-Hib-3+PCV | 4,834 / 641,230 | 1.00 | 1.00 |
| | DTaP-IPV-Hib-4+PCV | 1,483 / 232,337 | 0.68 (0.60 to 0.78) | 0.70 (0.61 to 0.79) |
| Other | DTaP-IPV-Hib-3+PCV | 1,725 / 642,120 | 1.00 | 1.00 |
| | DTaP-IPV-Hib-4+PCV | 475 / 233,086 | 0.57 (0.45 to 0.71) | 0.59 (0.47 to 0.74) |

¹Hazard ratios from Cox regression with age as underlying time scale and stratified for date of birth

² Adjusted for sex, chronic disease, hospitalization for any reason between age 8 and 9 months, birth weight, gestational age, maternal age and parity, parental country of birth, and postal code.

Abbreviations: CI, confidence interval; DTaP, diphtheria-tetanus-pertussis (acellular); Hib, Haemophilus influenzae serotype b; IPV, inactivated polio vaccine; MenC, meningococcal disease serogroup C; MMR, measles-mumps-rubella; PCV, pneumococcal conjugate vaccine.

Table F. HR (95% CI) for all hospital admission (including day admissions without an overnight stay) due to infectious disease according to the most recent vaccination

| Outcome | Most recent vaccination | Events /person-years | Hazard ratio (95% CI) ¹ | |
|------------------------------|-------------------------|----------------------|------------------------------------|----------------------------------|
| | | | Age adjusted | Fully-adjusted ² |
| All infections | DTaP-IPV-Hib-4+PCV | 14,748 / 283,780 | 1.00 | 1.00 |
| | MMR+MenC | 27,228 / 763,685 | 0.38 (0.37 to 0.40) | 0.40 (0.38 to 0.41) |
| Upper respiratory infections | DTaP-IPV-Hib-4+PCV | 12,063 / 284,226 | 1.00 | 1.00 |
| | MMR+MenC | 22,891 / 767,395 | 0.34 (0.33 to 0.36) | 0.36 (0.34 to 0.37) |
| Lower respiratory infections | DTaP-IPV-Hib-4+PCV | 1,366 / 285,706 | 1.00 | 1.00 |
| | MMR+MenC | 2,384 / 783,269 | 0.52 (0.45 to 0.60) | 0.57 (0.49 to 0.65) |
| Gastrointestinal infections | DTaP-IPV-Hib-4+PCV | 1,991 / 285,631 | 1.00 | 1.00 |
| | MMR+MenC | 3,252 / 782,423 | 0.66 (0.58 to 0.75) | 0.69 (0.61 to 0.78) |
| Other infections | DTaP-IPV-Hib-4+PCV | 769 / 285,819 | 1.00 | 1.00 |
| | MMR+MenC | 1,591 / 784,015 | 0.59 (0.49 to 0.71) | 0.61 (0.51 to 0.73) |
| Injuries and poisoning | DTaP-IPV-Hib-4+PCV | 1,933 / 269,677 | 1.00 | 1.00 |
| | MMR+MenC | 4,954 / 786,171 | 0.78 (0.69 to 0.87) | 0.80 (0.71 to 0.89) |
| All infections | DTaP-IPV-Hib-3+PCV | 17,908 / 638,258 | 1.00 | 1.00 |
| | DTaP-IPV-Hib-4+PCV | 9,960 / 229,014 | 0.47 (0.45 to 0.49) | 0.48 (0.46 to 0.51) ³ |

¹ Hazard ratios from Cox regression with age as underlying time scale and stratified for date of birth

² Adjusted for sex, chronic disease, hospitalization for any reason between age 8 and 9 months, birth weight, gestational age, maternal age and parity, parental country of birth, and postal code;

³ Adjusted for sex, chronic disease, birth weight, gestational age, maternal age and parity, parental country of birth, and postal code. Abbreviations: CI, confidence interval; DTaP, diphtheria-tetanus-pertussis (acellular); Hib, Haemophilus influenzae serotype b; IPV, inactivated polio vaccine; MenC, meningococcal disease serogroup C; MMR, measles-mumps-rubella; PCV, pneumococcal conjugate vaccine.